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ABSTRACT

This instructional handbook is one of a series of ten packets designed to form a comprehensive course in nutrition for secondary students. This unit takes a critical look at the claims being made for vitamin C and it introduces students to the other water-soluble vitamins, the B-complex. It contains a page of teaching suggestions, a pre-test for the students, and factual nutrition information with examples of how this information can be used in daily living. A post-test and bibliography are included. (JD)

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Ms. Agnes Torres
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Dear Ms. Torres:

This letter is in reference to our telephone conversation concerning curricular materials developed in Pennsylvania for secondary school students to be placed for retrieval from the ERIC data base.

Enclosed please find two sets of ten instructional packets entitled: "New Horizons in Nutrition" for your review and evaluation. Please forward the necessary papers and reproduction release forms to:

INST

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If you have any questions, please don't hesitate to call me.

Sincerely,

James G. Hobbs

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Enclosures

1A

NEW HORIZONS IN NUTRITION

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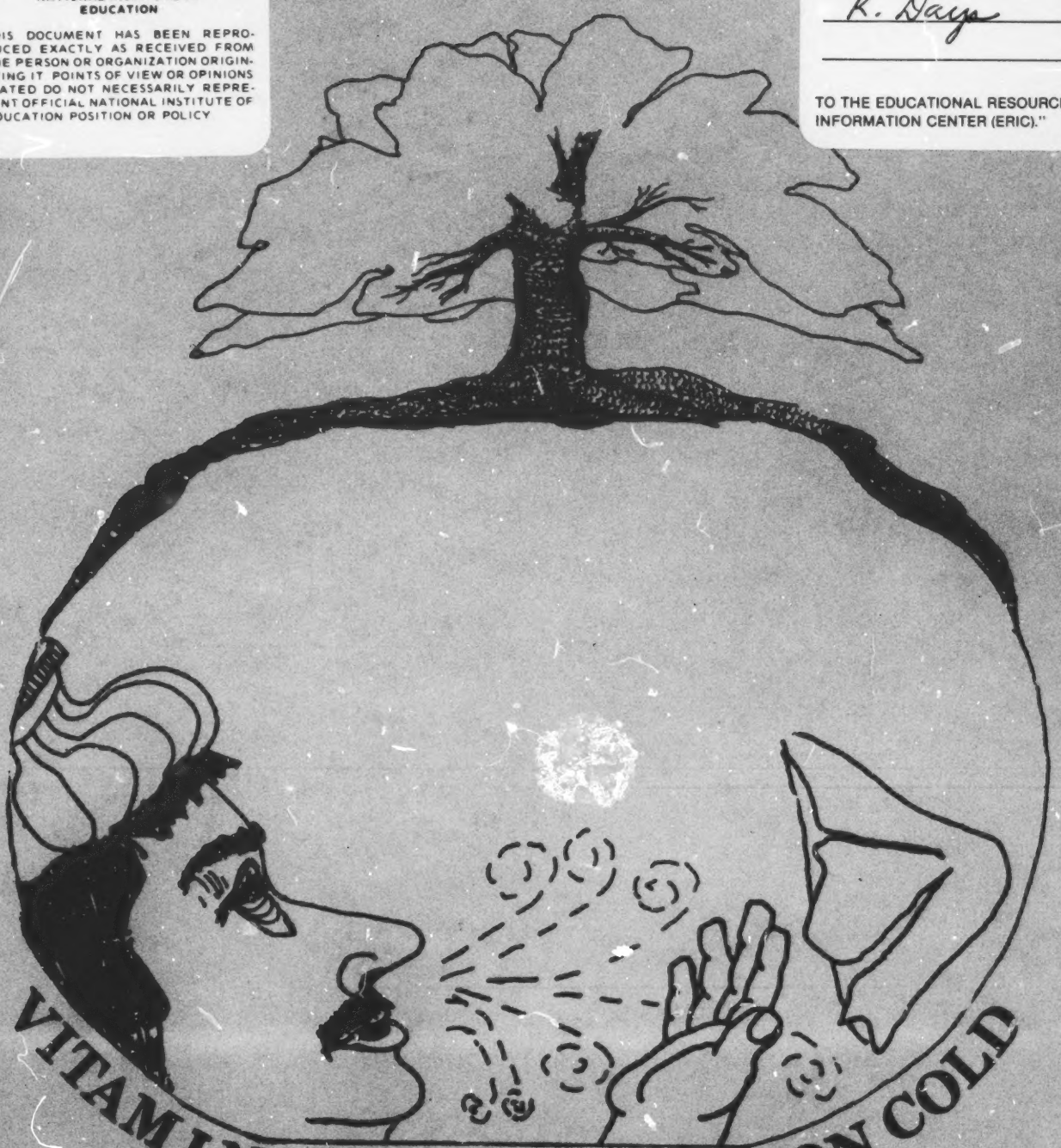

VITAMIN C and the COMMON COLD

SP 016 752

VITAMIN C AND THE COMMON COLD

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NEW HORIZONS IN NUTRITION

AN ISSUE ORIENTED APPROACH

BY

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DEVELOPED THROUGH A NUTRITION EDUCATION AND TRAINING GRANT FROM THE PENNSYLVANIA DEPARTMENT OF EDUCATION TO

LUZERNE INTERMEDIATE UNIT 18
368 Tioga Avenue
Kingston, Pennsylvania 18704

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PROGRAM INTRODUCTION

These ten instructional packets are designed to help you make the science of nutrition a fascinating, relevant topic of study for your students. The study of nutrition is the most basic of all skills as eating is something done by every student every day of his or her life. With the intrinsic relationship between proper nutrition and good health, it is vitally important that we help students to make intelligent decisions with regard to what they eat.

The ten packets which make up New Horizons in Nutrition can be taken together to form a comprehensive course in nutrition for secondary students. If you prefer, individual packets can be used when they're relevant to specific topics in health, home economics, science, or social studies classes. In addition, you can use the materials with entire classes or individual students can be given the packets for self-directed study.

Each packet contains a page of teaching suggestions which can easily be detached before the rest of the booklet is given to the students. The materials for the students include a pre-test, a selection which provides the students with factual information and examples of how this information can be utilized in everyday life, and a post test. Reading the selections and completing the evaluation devices is not enough to insure mastery of the concepts. We urge you to reinforce the packets by following through with related classroom activities. You'll find suggestions in the "Notes to the Teacher" or use them as a springboard to develop activities more ideally suited to the needs of your students. Finally, brief bibliographies are provided with each packet which lists related readings and audiovisual materials.

These suggested materials are not meant to be used as a research bibliography. Rather, they are sources of additional information which are likely to be of interest to secondary students.

The topics of the ten packets are:

1. *Advertising*
2. *Back to Basics*
3. *The Emotional Aspects of Nutrition*
4. *Food Faddism*
5. *Low Carbohydrate Diets*
6. *Nutrition and the Athlete*
7. *Nutrition: Yesterday, Today, and Tommorrow*
8. *Social Issues in Nutrition*
9. *Vegetarianism*
10. *Vitamin C and the Common Cold*

We sincerely hope these packets help you to make nutrition education an alive, relevant, and exciting topic of study for you and your students. The benefits for everyone are well worth your effort.

The Authors

TEACHING NOTES

INTRODUCTION

There is currently much discussion regarding vitamin C and its role in preventing the common cold. This unit takes a critical look at the claims being made for vitamin C and it introduces students to the other water-soluble vitamins, the B-complex.

OBJECTIVES

1. Students will identify the functions and food sources of vitamin C.

2. Students will evaluate the role played by ascorbic acid in preventing the common cold.

3. Students will list common food sources and functions of the major B-vitamins.

SUGGESTED ACTIVITIES

1. From the library, obtain two or three articles which promote vitamin C as a prevention measure for the common cold. Review with students the proper method for conducting a scientific study. Stress factors such as sample size, control groups, and placebo effects Using the information in the packet, critique the articles to determine if their claims are justified.

2. Prepare a bulletin board display of possible snack foods which are high in vitamin C or the B-vitamins.

3. Demonstrate the proper method of cooking fruits and vegetables to retain maximum amounts of the water soluble vitamins.

PRE TEST KEY

1. F
2. F
3. T
4. F
5. F
6. T
7. T
8. T
9. F
10. T

POST TEST KEY

1. Kidney Stones
2. Severe diarrhea
3. Possible misreading of urine sugar test in diabetics. Alternative answers may relate to vitamin C during pregnancy.

4.
5. Answers may vary. See chart in
6. packet.
7.

8. T
9. T
10. F

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PRE TEST

1. _____ Vitamin C in large doses can prevent the common cold.

2. _____ Vitamin C is a very stable vitamin in the presence of air and water.

3. _____ A deficiency of vitamin C is called scurvy.

4. _____ One of the few food sources of the B-vitamins is brewer's yeast.

5. _____ The average person needs at least 500 mg of vitamin C each day.

6. _____ Ascorbic acid is another name for vitamin C.

7. _____ Vitamin B12 is not an automatic "cure-all" for everyone suffering from fatigue.

8. _____ All of the B vitamins are considered "water soluble".

9. _____ The only way to have an adequate amount of vitamin C is to take a supplement (or vitamin pill) each day.

10. _____ Many of the B-vitamins are necessary for the proper functioning of the nervous system.

VITAMIN C AND THE COMMON COLD

Do you feel that optimum health requires the daily intake of hundreds or thousands of milligrams of vitamin C? Have you ever taken such a large dose of C to prevent or cure a cold? If you have, then you are probably a believer of Linus Pauling. In 1970 Linus Pauling's book, "Vitamin C and the Common Cold", was published and immediately became a best seller. Then the controversy began. Were massive doses of vitamin C really necessary for health?

For years the arguments continued. It is now known that vitamin C does not cure or completely prevent a cold. However, the claim that vitamin C lessens the severity of colds remains controversial. It is important to remember that you will often see vitamin C referred to as "ascorbic acid". We will use both terms here.

HISTORY OF VITAMIN C

The knowledge of ascorbic acid follows the course of history. The discovery of the curative powers of vitamin C dates back to the mid 18th century, aboard the British ship, HMS Salisbury. Dr. James Lind found that oranges, lemons, and limes could cure scurvy. He found that the citrus fruit had curative powers. However, it took 50 years for the British navy to supply sailing vessels with this fruit. Since limes were a part of the cure discovered by Dr. Lind, the term "limey" is the name given to British sailors.

VITAMIN C REQUIREMENT

The requirement for ascorbic acid has fluctuated. In 1974 the U.S. Recommended Dietary Allowance for vitamin C was reduced from 60 mg to 45 mg per day. Research over the last five years proved that this amount was inadequate, so in 1979 the requirement was changed back to 60 mg per day. This simply means that you only need 60 mg of vitamin C per day, not the hundreds or thousands of milligrams that is recommended by Linus Pauling.

As was mentioned earlier, the claim that vitamin C lessens the severity of colds is still controversial. Various clinical studies have been undertaken to study this claim. The studies divided the subjects into two groups. One group was told that they were given vitamin C. In actuality, they were given a ***placebo,*** a fake pill. Under the mistaken idea that they were taking ascorbic acid, the subjects claimed to have fewer colds.

The second group was given vitamin C, but they were unaware of this fact. These subjects reported no change in the number or the severity of colds. Most of these studies have proved that "the power of suggestion" is the determinant, not the actual taking of vitamin C.

HAZARDS OF LARGE DOSES OF VITAMIN C

Vitamin C is a water soluble nutrient, and as such, the excess is excreted or eliminated from the body. Solubility of a nutrient means that it can dissolve in a given substance. A water soluble nutrient, such as Vitamin C, would dissolve in water. Many so-called authorities in the field advocate large doses on the premise that they are not harmful to the body. Recent studies have indicated that this is not so. It has been found that difficulties are associated with large doses. Some of the difficulties that can arise are: kidney stones, severe diarrhea, and the possibility of harm to diabetics. Also it is especially dangerous during pregnancy, not only to the mother but also to the developing fetus. In this case the baby would be born with the added amount of vitamin C as a requirement. If this requirement is not met, the baby then can develop scurvy.

Kidney stones can be extremely painful, may require a modified diet, and in some instances, may necessitate surgery.

Severe diarrhea can lead to dehydration, weakness, and a disturbance of the electrolyte balance (the electrolyte balance is maintained by many minerals such as sodium, potassium, and chloride). Electrolyte imbalance could lead to hospitalization.

The body passes off the amount of vitamin C that it does not need. But the tissues of the body may become supersaturated with vitamin C before the excess is excreted. The presence of ascorbic acid in the urine makes it impossible for a diabetic to get an accurate urine test. Vitamin C gives a false indication of the sugar levels. Thus, the diabetic may be confused.

FUNCTIONS AND SOURCES OF VITAMIN C

Vitamin C does perform many functions in the body.

1. ***It is required for the synthesis of materials which holds all the body cells together and in their proper place.*** It also strengthens the blood vessels. Our teeth are held in their sockets by vitamin C, and the normal health of the walls of the blood vessel depends upon vitamin C. If the blood vessel lacks strength, it will break, causing the blood to spread out underneath the skin. An early sign of a vitamin C deficiency can appear like an ugly bruise.

2. ***Vitamin C is necessary for proper healing of wounds.*** It helps to form the scar tissue that pulls a wound together.

3. ***Vitamin C is necessary for the formation of the teeth and the bones.*** Bones and surrounding tissue may become extremely painful if ascorbic acid is deficient.

4. ***Vitamin C helps in the resistance to infection.*** This nutrient may help fight an infection once it is present in the body. It cannot prevent the infection from entering the body.

FOOD SOURCES:

Citrus Fruit - grapefruit, oranges, lemons and limes

Other Fruits - strawberries, cantaloupe, and pineapple

Vegetables - broccole, brussels sprouts, spinach, kale, green peppers, cabbage, turnips, potatoes, sweet potatoes, and tomatoes.

? = COLD PREVENTION

VITAMIN C RETENTION

Ascorbic acid is a water-soluble nutrient, and thus it is easily lost. Heat can destroy it, soaking in large amounts of water can cause a reduction in the amount of vitamin C available if the water is discarded. It is not a good idea to soak a vegetable containing vitamin C in a large amount of water, nor is it good to cook such a vegetable in a large amount of water. Never subject a food containing vitamin C to high heat, because this results in a great loss of the vitamin.

Any food containing ascorbic acid should be stored under refrigeration. This tends to stabilize vitamin C. Juices, such as orange, grapefruit or tomato, etc. should be placed in a covered container and kept under refrigeration.

SIGNS OF A DEFICIENCY

Early signs of a vitamin C deficiency are tender gums that bleed easily, and the tendency to bruise easily. The severe deficiency disease is scurvy, which is rarely seen in the U.S. today. In scurvy the gums become swollen, infected, and have a tendency to bleed. The bones in the legs become extremely tender, the teeth loosen and may fall out. Anemia also appears. Scar tissue may breakdown, and previously healed wounds may reopen. Hemorrhages appear under the skin, and even the slightest injury can produce excessive bleeding. Scurvy can be fatal if it remains untreated.

SUMMARY

Sixty mg per day is all that we require. Vitamin C cannot prevent a cold, but it may fight the infection once it is present. Large doses of ascorbic acid may be harmful. Make sure that you get enough vitamin C each day, but watch excessive amounts.

VITAMIN - B COMPLEX

The B complex makes up the other part of the water-soluble vitamins. Many misconceptions have arisen concerning these vitamins. Vitamin B*12* is one of the vitamins most commonly misunderstood. The belief is that the old "rundown feeling" or that feeling of depression, may be cured with B*12* supplements. This is not true. This appeals to our psychological feelings. B*12* supplements will only help when there is a true deficiency, and such deficiencies are rare.

HISTORY

When the researchers discovered vitamin B, they thought it was a single vitamin. A cure for the disease, beriberi, was being sought. When the water-soluble vitamin was found that cured the disease, it was given the name vitamin B. Research has since proved that it was not a single substance that was discovered in 1911, but a group of compounds which are designated under the title vitamin - B complex. All of these vitamins are interrelated and all are involved in the release of energy within the body.

MEMBERS OF THE B-COMPLEX

The chart on the following page lists the better known members of the B group, their functions, food sources, and some deficiency signs.

VITAMIN B GROUP

VITAMINS	SOURCES	FUNCTION	DEFICIENCY SIGNS
Thiamin, B1	Whole grain and enriched breads, cereals, flours, liver, meat (especially pork) dried peas and beans and nuts, milk, green vegetables.	Promotes normal appetite and digestion; necessary for the nervous system, helps to change food into energy.	Poor appetite, poor muscle tone in the digestive system, mental depression, apathy; neuritis, edema; cardiac failure, beriberi.
Riboflavin, B2	Liver, milk and milk products such as cheese, green leafy vegetables, meat, eggs, whole grain and enriched bread and cereal.	Helps the cells use oxygen. Helps maintain good vision. Needed for smooth skin around mouth and nose. Helps change food into energy.	Cracks at corners of lips. Scaly dermatitis around nose and ears, sore tongue and mouth, burning and itching of eyes.
Niacin, Nicotinic Acid, Nicotinamide	Liver, meat, fish, poultry, green vegetables, nuts, (especially peanuts) whole grain and enriched breads and cereals.	Promotes normal appetite and digestion. Necessary for the nervous system. Helps change food into energy.	Loss of appetite, inflamation of the tongue, dermatitis, breakdown of the nervous system, pellagra.
Pyridoxine, B6	Meats, poultry, fish, potatoes, sweet potatoes, vegetables.	Helps the body utilize protein. Helps change food into energy.	Nervous irritability, convulsions, weakness, abdominal pain, dermatitis, anemia.
Vitamin B12 Cyanocobalamin	In animal foods only; organ meats (such as liver), meat, fish, poultry, eggs, milk.	Necessary for maturation of red blood cells. Necessary for the synthesis of DNA and RNA.	Anemia - this type is characterized by abnormally large red blood cells.
Folacin, Folic Acid	Liver, deep-green leafy vegetables, poultry, meat, fish, eggs, whole-grain cereals.	Requires vitamin C for utilization. Interrelated with vitamin B12. Necessary for maturation of red blood cells.	Anemia - characterized by large and irregular shaped red blood cells. May occur in infancy and pregnancy.

SUMMARY

Vitamin-B complex has many members. If we supply the better known ones daily, then all will be supplied. We need the B-complex everyday. A deficiency of one may produce a deficiency of several others in this group. Remember that vitamins should not be taken for that "rundown feeling". Perhaps if we are feeling poorly or rundown what we really need is a good night's sleep and proper eating habits!

CASE STUDY

Gary was a high school senior with a frantic schedule. As editor of the yearbook, a member of the basketball team, and the bass guitarist in a struggling band, Gary barely could find time to eat.

Lately Gary seemed to be feeling very run-down. He was plagued with one cold after another, and the usual cold remedies he found in his home medicine cabinet just didn't seem to be very effective. Recently while he was waiting to have his hair trimmed by a local stylist, Gary picked up a leading sports' magazine. Glancing through the magazine, Gary found an article about one of his favorite baseball stars. In the article, Gary's hero attributed much of his success to the diet which he followed. Of particular importance he emphasized taking large doses of vitamin C (500 mg twice a day) to ward off respiratory infections as well as vitamin B*12* supplements to keep his energy levels high.

Gary was impressed with what he had just read. He felt sure that a major sports figure would be knowledgeable about nutrition so Gary decided to follow his advice. On his way home, he stopped at a drugstore and purchased a bottle of 500 mg ascorbic acid tablets and vitamin B*12* supplements. Gary hoped his long series of colds would soon be over.

QUESTIONS

1. Using reference materials in your classroom or library, list factors other than nutrition which can result in frequent colds.
2. Comment on the alleged expertise of the baseball star to comment on nutrition. Is there any validity to the claims of one individual and how he reacts to a particular diet or use of supplements?
3. What effects might Gary experience from taking mega doses of vitamin C?
4. What will happen to the ascorbic acid which Gary's body does not use?
5. What might you tell Gary regarding his expectation the vitamin B*12* will help to relieve his fatigue?

POST TEST

List three possible hazards of taking too much vitamin C.

1.

2.

3.

List at least one good food source for each of the following:

4. Thiamine

5. Niacin

6. Riboflavin

7. Vitamin B*12*

8. _____ A balanced diet is the best way to assure that a person is receiving adequate nutrients.

9. _____ Ascorbic acid and the B-complex vitamins can easily be destroyed by heat and lost in water used in cooking.

10._____ Large amounts of vitamin C can prevent the common cold.